Development and validation of a dynamic material flow analysis model for French copper cycle

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Résumé en anglais	This study performs a quantitative description of the copper life cycle at the scale of France from 2000 to 2009 with special focus on waste streams. The approach is based on substance flow analysis and includes data reconciliation. The model takes into account the relationships between economic system, resource consumption, product manufacturing, waste generation and pollution, thus broadening the traditional scope of process systems engineering. The more important results concern waste management since France exports most of its collected copper wastes because there is no industry for recycling low-grade scrap. The paper shows the interest of using substance flow analysis methodology coupled with data reconciliation to obtain a precise cartography of a substance flow inside a large area. Indeed, statistic data from institutional organisms and industries may vary from one source to the other, and the utilization of the redundancy of information is an efficient tool for obtaining more precise data. Moreover, the dynamic analysis allows modelling the stock evolution with more accuracy than in previous studies. Finally, the results are compared with existing values for other countries or continents, and some perspectives concerning the use of copper in France are given.
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